

LOSSES TO CORN

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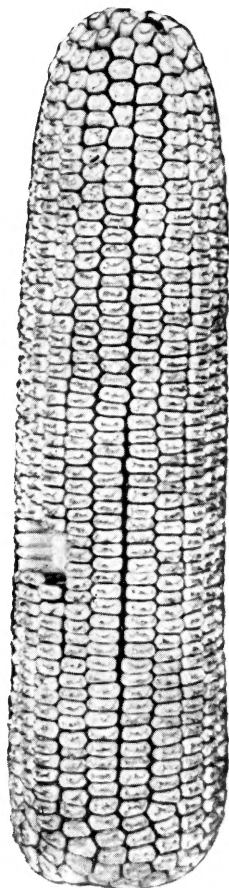
What to Look For and Where to Find It

Being one of a series of articles in relation to crops, their common diseases, and insect pests to which they are subject



Published by
HAIL DEPARTMENT
Western Adjustment & Inspection Co.
CHICAGO

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AN ARTICLE RELATING TO

CORN

Describing, in common terms, the nature and delicate characteristics of that all-important food cereal.

Some expressions are added as to its predatory enemies—plant diseases and insect pests.

“While there is no country in the world that can teach American industry much, there is likewise not a country which cannot teach American agriculture something. The time for us to learn grows shorter and shorter. We can no longer go from the depleted field to the virgin field. We must have a better agriculture.” —*Gov. Frank O. Lowden (Illinois).*

FOREWORD

This is the first of a series of articles we hope to issue in relation to cereal crops, their common diseases, and insect pests to which they are subject.

This treatise relates wholly to corn, but will be followed by others relating to oats, flax, wheat, and various cereal plants.

These offerings are gratuitous, but will have been prepared with considerable care by the Adjustment Company in the belief that they may prove of some value to every institution writing hail insurance.

WESTERN ADJUSTMENT & INSPECTION Co.

Chicago, January 1, 1919.

INTRODUCTORY AND FOREWORD TO ADJUSTERS

"He who knows what not to say,
Holds half the secret of success."

A successful adjuster of hail losses must be diplomatic, even-tempered, and well informed on agricultural topics.

The really successful adjuster is the one who is able to induce the impression that he is representing both the company and the claimant, and whose sole aim is efficiently and correctly to establish the true measure of loss without fear or favor.

He must determine whether climatic conditions have retarded the crop, whether improper farming methods have contributed to the loss, and whether insects and diseases have caused any part or all of the claimed damage. He must know whether or not animal enemies have been at work; that is, he must quickly and surely separate the other losses from that for which the company is properly liable, demonstrating conclusively to the claimant that he is a disinterested neutral with the sole aim to deal fairly and intelligently for the two principals to the insurance contract.

He should so thoroughly educate himself in practical farming that he can helpfully and intelligently advise, whenever his counsel is sought, disseminating his information in a spirit of friendly helpfulness; for this is an era of progress, and increased production is vitally necessary to the future welfare of the nation. The farm is the source of our food supply, and anyone who can, by timely counsel, assist a farmer toward more careful and scientific methods benefits not that one man alone, but all mankind.

With the world crying for food, slack and careless methods of farming border closely on criminal negligence.

This is a progressive age. Particularly is this true of farming. Conditions of husbandry are changing rapidly. The farmer himself is changing to a new type—one that maintains a position on a level with other professions. He is not the "hayseed" at whom his city cousin poked fun

twenty years ago. By far the greater proportion of farmers are educated, well and widely read, and eager to add to their knowledge.

Competition caused by increased values of land and labor are the primary causes of the farmer's advancement in scientific agriculture. He has found that increasing his knowledge of crop enemies helps him to hold and retain his position in the agricultural world and returns as well a handsome profit in the way of increased yields.

The improved methods and conditions on the farm are largely due to the educational work carried on by the United States Department of Agriculture, the agricultural colleges and experimental stations, the various agricultural societies, and the farm press.

Millions of dollars are being expended annually by these institutions in the interest of better farming. They are furnishing the farmer with an abundance of most valuable information on such subjects as soil management, seed selection, crop rotation, destruction by crop enemy insects, crop diseases, and kindred subjects, and the farmer who does not avail himself of these advantages is overlooking a source of most useful and helpful learning.

Crop insect and disease bulletins by the thousands are printed every year. An increasing number of farmers are diligent readers of these pamphlets, which contain many practical suggestions. Other suggestions are not so helpful, and for the individual to grope through them all, endeavoring to sort out the really good ideas, often consumes more valuable time than the returns warrant. For this reason, the bulletins are frequently ignored or carelessly read.

With this in mind, we have prepared this little book for our hail adjusters as an outline study and a ready field reference.

We have endeavored to include only those causes of loss most frequently encountered in our territory, and treatment of them has been condensed as much as possible in order that adjusters may not be burdened with a needless groping through masses of irrelevant discussion or tedious detail interesting only to an entomologist.

Some of the infrequent conditions of loss are not included, as they are of such unusual occurrence or cause

such insignificant damage that it is needless to encumber this article with them. Likewise descriptions of some few diseases and insect enemies, closely related and of almost identical habits of destruction, are combined. To discuss them separately would require the finest entomological distinctions and these seem unnecessary for our purposes.

Should information concerning any of the unrecorded conditions be desired, we are prepared immediately to furnish complete data to all adjusters in any affected district. Unknown or unusual causes of loss should be reported to our head office, with complete description and samples of grain or of insects encountered. The special subject will then be analyzed and a supplemental bulletin issued.

Any measures tending to increase the adjuster's fund of information are valuable because, of the many prerequisites to successful dealing with farmers, the most important is knowledge of agriculture.

It is impossible to know too much on that subject. Our adjusters add to their efficiency by increasing their knowledge of crops. There is where the quality of work shows. Agriculture is a big subject—it is impossible for any one man to know all about it—but the more of it known, the more valuable will be this service. We wish to spread this viewpoint.

PART ONE

INSECT ENEMIES

Aside from the dangers of improper farming methods, the uncertainties of climatic conditions, and the ravages of diseases against which the struggling corn plant must fight its way to a successful maturity, there are 214 species of insects injurious to the corn crop. We have not attempted to describe them all or even to enumerate them here, but have included those most injurious and most frequently encountered throughout the corn-growing districts.

Explanation of Terms

Larva—Caterpillar or worm stage.

Pupa—Cocoon or resting stage from which the adult emerges.

Cornstalk Borer

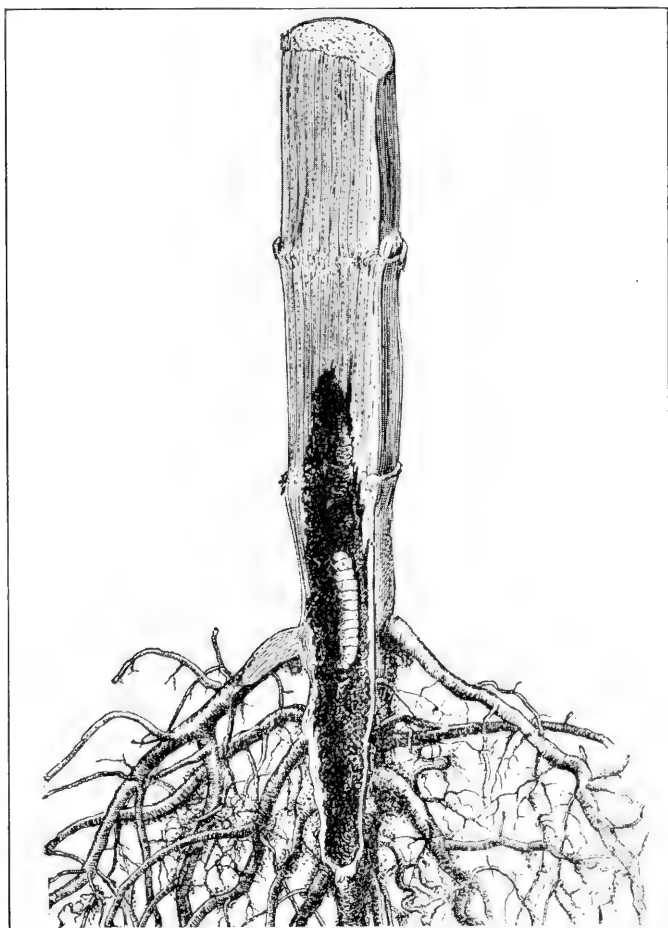
The cornstalk borer is about an inch long when full grown. Its color varies from purplish to whitish brown, according to age, and it is marked with five white stripes—one running down the middle of the back, and two on each side. These side stripes are interrupted, being absent on the first four segments of the abdomen, giving the larva an appearance of having been pinched or injured there. The stripes nearly vanish as the larva matures. The head and top of the neck and the leathery anal shield at the opposite end of the body are light reddish yellow, with a black stripe on each side.

The presence of the cornstalk borer in a young stalk of corn is very clearly indicated by the wilting, breaking down, and death of the top and by the presence of a round hole in the side of the stalk plugged with the brown excrement of the caterpillar within.

The borer infests a great variety of plants in a precisely similar way. It is most noticeable in early spring in bluegrass by roadsides or around the borders of a field, its presence being indicated by the whitening of single heads while all the rest of the plant is green. At this time it is of small size and finds sufficient food within the grass stem;

but later it is compelled to resort to thicker-stemmed plants, and it is then that it appears in fields of corn.

The burrow which the stalk borer makes within the stem runs upward from the entrance opening, and of course varies in size with the growth of the larva. Sometimes in leaving a stalk it makes a new hole above the one by which it entered, and it may in this way burrow in succession several different stalks.



CORNSTALK BORER.

Larva, in the lower part of corn plant, eating away the heart of the stalk. A light hailstorm accompanied by wind will give the field the appearance of having been heavily damaged by hail.

Corn is injured by this pest while from two to ten inches high. This is only one of several insects which produce the same general effect, but its depredations may be at once distinguished by the round hole which it leaves in the stem of the infested plant. Its work is largely within the stem and is so concealed that in most cases, unless weather conditions make it conspicuous, the presence of the insect passes unnoticed.

Corn is damaged by these caterpillars in two ways. First, in the early part of the season, while the plants are small, they work in the "throat" of the young corn, and if the tender growing tip within the protecting leaves is once damaged the plant will not become a normal productive specimen. In many sections of the South this is commonly known as "bud-worm" injury, and though there are several other insects which cause a similar mutilation of the leaf, a very large proportion of the so-called "bud-worm" damage may be charged to this insect. The effect of its work on the leaves of the young corn plants is similar to that resulting from attacks by the corn bill bugs and is evidenced by the familiar rows of small circular, or irregular, holes across the blades of the plant.

The Corn Bill Bug

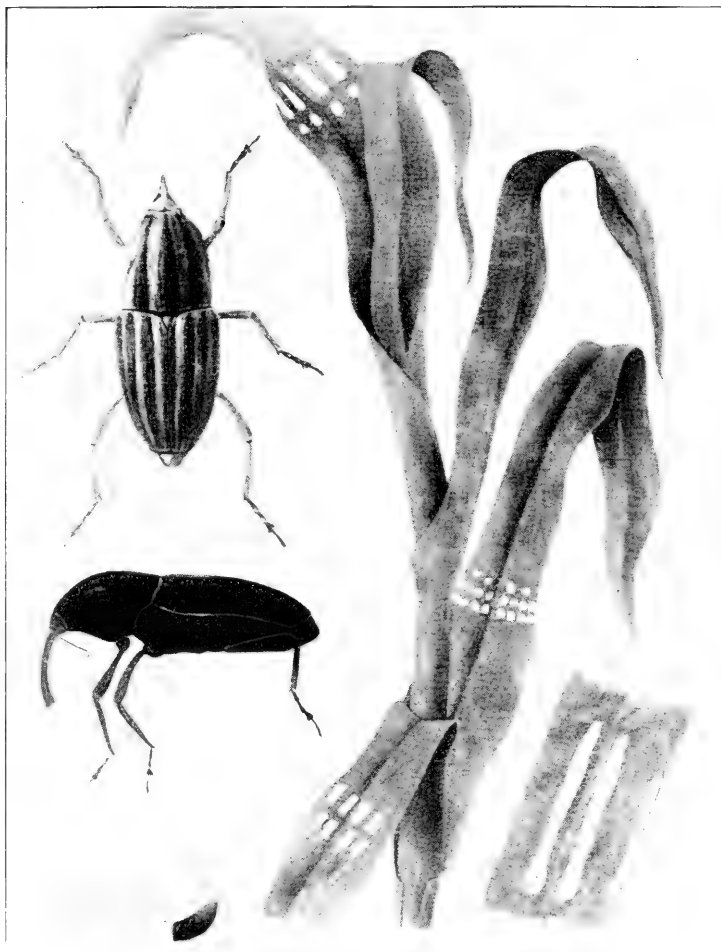
When growing corn is but a few inches high the tender leaves are often injured by rows of holes cut across the blade by the corn bill bug; when severe, the injury causes the growing plant to be greatly stunted. This kind of injury is most likely to occur when corn directly follows timothy sod. It is therefore well to determine what kind of crops were produced on the field the previous year when a supposed hail damage bears a resemblance to the work of the corn bill bug.

When corn is starting in the spring this beetle will cling to the young, tender stalks, with head downward, and eat its way into and often through the center of the stalk. This kills most of the plants, but when corn survives the attack the leaves will bear from two to five holes, all in a row. The injured blade is still within the sheath of the stalk when the damage is done, and the holes do not become noticeable until after the blades grow out. It is therefore evident that a corn plant can be injured by the bill bug and the damage thus caused may easily be con-

fused with hail damage after the blade has grown from the sheath, which may take from a week to ten days.

The corn bill bug is a snout-beetle, varying from five-sixteenths to six-sixteenths of an inch in length.

There are several kinds of bill bugs. Most of them are black or brown in color. One kind is clay colored. All are beetles with hard backs, and with a long snout with



THE CORN BILL BUG.

Showing how it eats the leaves of young plants. If a few additional holes were added to this plant by hailstones, the grower might contend that the whole visible damage was caused by hail.

which the holes in the corn blades are made. The larvae usually feed on the roots of certain grasses, largely on timothy roots. Hence when corn has been planted on timothy sod that has been infested with these grubs, the mature bill bugs are very likely to attack the corn as soon as it appears above the ground, especially if the sod is turned under in the spring.

Unless the leaves have been badly stripped by hail, showing conclusive evidence of hail damage, a close examination of the plants should be made for evidence of the bill bug.

White Grubs

The young of the May beetles are capable of devastating and frequently destroying large portions of farm crops



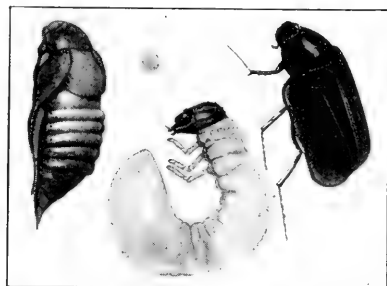
DEFOLIATED TREES.

Walnut and soft maple, the former defoliated by May beetles. They much prefer corn leaves.

by eating the roots. The crops damaged include two of our most important staples, namely, corn and potatoes. The adults—the beetles—often becomes so ravenous that they also eat the leaves of certain trees.

These insects require three years to complete their life cycle, and usually only one brood is destructively active in a given locality. An abundance of May beetles one year presages a large growth of grubs the following season.

It should be remembered that injury from white grubs, as well as from many other pests, may be forestalled by correcting farm practices; but after corn, or any field crop, has become infested it is impossible to prevent further injury to that particular crop for the current season.



WHITE GRUBS.

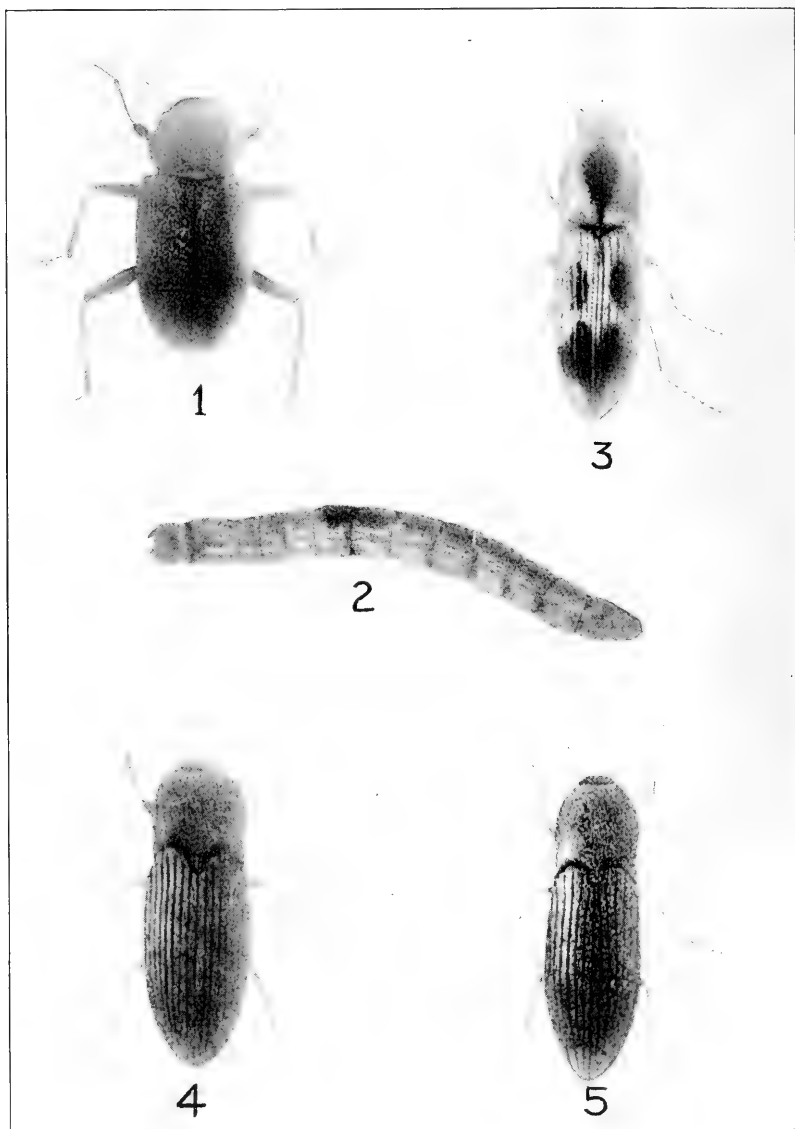
Showing the 3-year period of their cycle life.

In the worst infested districts it is not unusual to find from 40 to 60 white grubs in a single hill or corn. Indeed, in a cornfield near McGregor, Iowa, which had been planted to timothy the previous year (1917), 77 two-year-old grubs were found in an area only $2\frac{1}{2}$ feet square and 5 inches deep. This really represented an area less than that usually occupied by a single hill of corn, for the hills in this field were $3\frac{1}{2}$ feet apart.

Wireworms

Injury to corn by wireworms occurs in the spring soon after planting. The failure of seed to sprout, or the dying or withering down of corn plants about two feet or less in height, both indicate wireworm attacks. If a field so affected has been in grass a year or so previously, any injury is most likely to be that of wireworms. Although the larvae do not cause any injury to grass, when such land is put into corn the wireworms concentrate on the hills of the planted grain, causing much damage.

Wireworms feed first on the seed itself, later on the roots, eating the smaller ones entirely and boring or penetrating the larger ones.



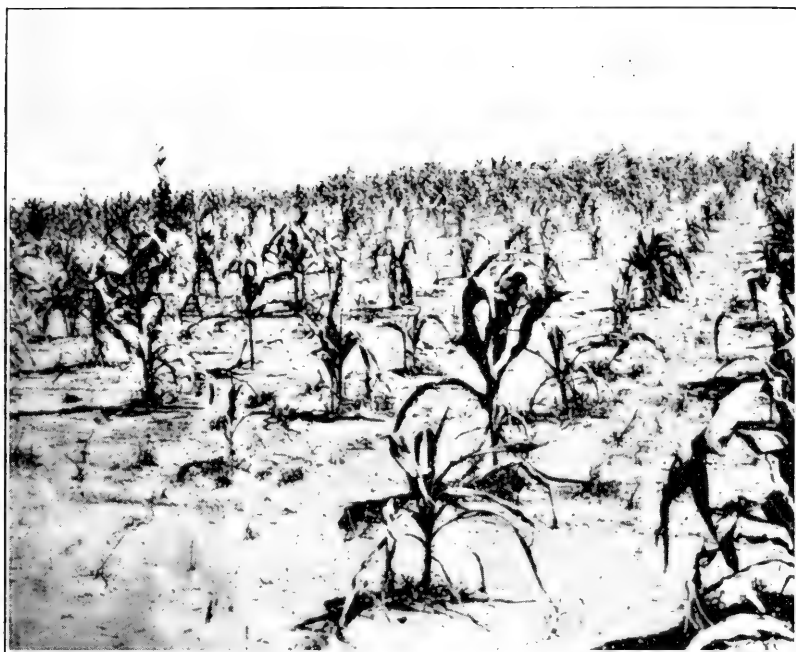
THE CORN WIREWORM.

1, 3, 4, 5—Types of the click beetle, adult of the corn wireworm.
2—The corn wireworm.

The common corn wireworms are reddish brown in color, hard and rather shiny in appearance, cylindrical in shape, and an inch or more in length.

Quite frequently these worms do not attack the plants until these are six inches or more in height.

A slight hailstorm upon a field of corn where these



CORN ATTACKED BY WIREWORMS.

Note the thin stand and stunted growth of the plants. The grower might claim that hail caused a set-back to this crop, but the wireworms know better.

They do not need any outside assistance to make a crop failure here.

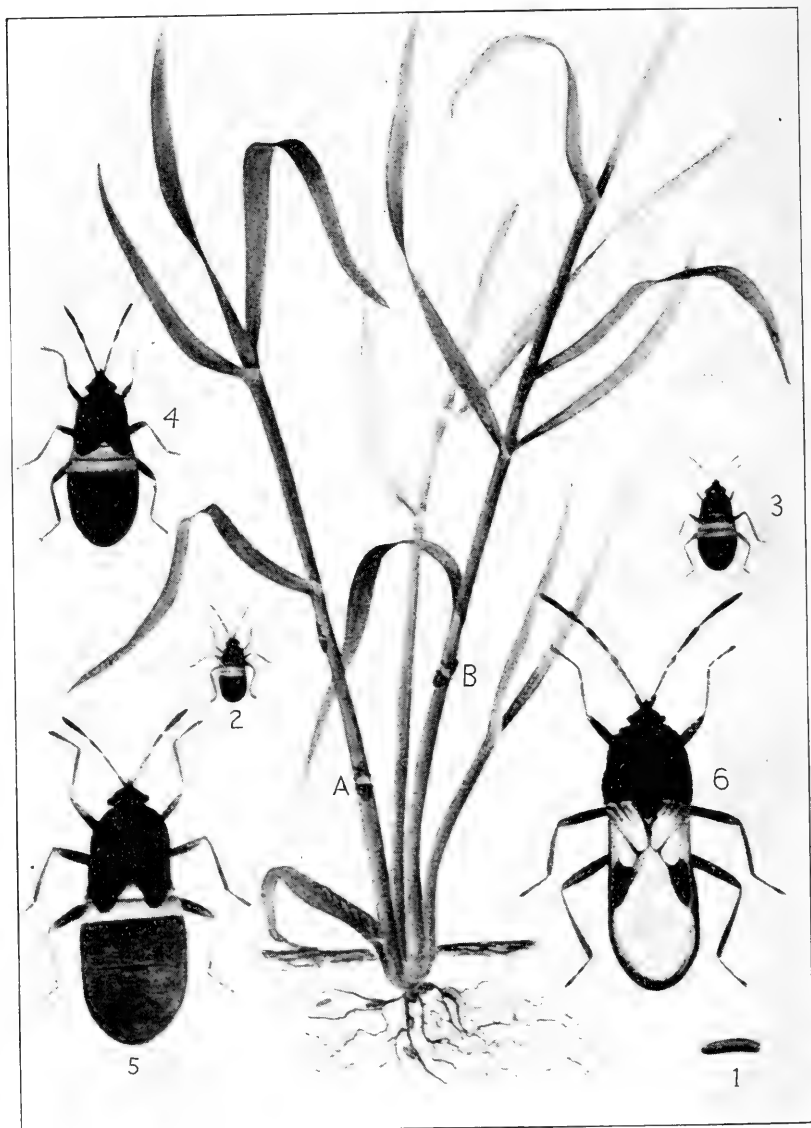
worms are at work will enlarge the claimed damage caused by the hail, the farmer insisting that hail caused the whole loss.

Close observation of adjoining fields and also of the roots of damaged plants will help to determine whether any loss has really been caused by hail. If wireworms are working on the plants they will be found on the roots, not of the dead plants but of those which are, to all outward appearances, in sound health.

The appearance of the dead plant is identical, whether the damage has been caused by hail, water, or wireworms.

The Chinch Bug

Damage to corn occurs, for the most part, in mid-summer when the growing bugs pass from ripening wheat to corn. It does not necessarily follow that the chinch bug



THE CHINCH BUG.

1, Larva; 2, 3, 4, 5, and 6, various sizes, enlarged.
A and B. Showing bugs on stalks.

will not become dangerous in localities where no wheat is grown. On the contrary such is likely to be the case.

This abominable insect, one of the very worst enemies of agriculture, is, on the whole, the most destructive to corn of all the insect species to whose attack this crop is subject.

It is estimated that the total agricultural losses due to the ravages of this insect have amounted in single states to from ten to twenty million dollars in a season, and throughout the whole habitat of this insect enemy, to a hundred million dollars or more in a single year.

The ravages of this insect are due to the sucking of the sap from the plants. Being without jaws for biting, it can appropriate only fluid food by piercing the tissues of the plant with the hair-like stylets of its beak and then sucking the sap from the lacerated cells. Owing to its immense numbers, it may so rapidly drain a strong and thrifty corn plant, a foot or two in height, that the plant will wither and fall to the ground as though cut off at the root.

At harvest time the young of the new generation are in various stages of development, owing to the fact that the eggs are laid at intervals during a period of about a month. There are at wheat harvest some winged bugs in the field, but the great majority of them are of ages varying from those just hatched up to the stage preceding the last molt. Forced out of these fields of small grain by the ripening of the plants and consequent possibility of starvation, the bugs enter fields of oats and corn in a continuous throng, making their migration wholly on foot. They thus concentrate in overwhelming numbers on the plants at the borders of the newly entered field, draining and killing everything as they go. It is at this time that the principal injury to corn is done.

The effect on corn varies with the extent of the attack. The work of destruction is thorough, and often, even in the migratory movement, every plant in several rows will be killed. The bugs move forward across the fields, attacking row by row, leaving scarcely a living stalk behind, and often ruin entire fields of 50 or 60 acres.

CUTWORMS

Cutworms are most damaging to corn when corn follows sod. The injury to young corn plants is known to

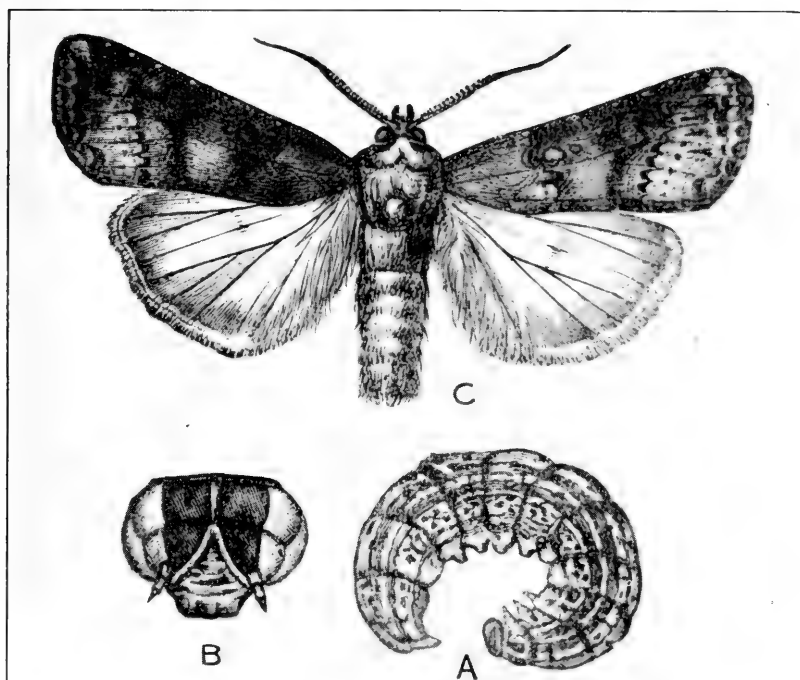


CUT WORM AT WORK ON STALK OF CORN.

most farmers, but the results of the work of cutworms are so similar to hail injury that the damage is often confused with that done by a hailstorm.

This injury should not be confused with that done by other corn pests. Usually the insect responsible for the damage may be found in the soil near the plant attacked.

Invariably, when a cornfield has been visited both by cutworms and a hailstorm, the farmer is likely to claim that the hail was responsible for all of the damage incurred,



THE CUTWORM.

A. Larva in characteristic position. B. Head of larva. C. Adult moth. (Greatly enlarged.)

when as a matter of fact cutworms by the thousand are destroying the plants.

A damaged plant has the appearance of having been cut off by a hailstone, and the only certain way to determine the exact cause is to locate the cutworm and call it to the attention of the claimant.

Full-grown cutworms are about one and one-half inches long, usually dull in color. They work on the young plants at night, and during the day they will be found on, or near, the corn roots asleep.

The Corn Root Worms

There are two species of root worms, to which three names are applied; namely: northern, western, and southern. The first two refer to the same pest. The southern



CORN ROOT WORM DAMAGE.

The corn root worm was responsible for this crop failure. The field was only partly infested by the worms. Note quality of plants where the worm has not molested the crop. The entire field was planted the same day.

variety is slightly different. The depredations of the corn root worms are very similar to, and easily confused with, hail damage.

Their presence in a field is usually indicated by a withering of the young plants, the failure to produce well-developed ears, or a general retarding of the growth without visible cause. A search among the roots of such stalks may bring to notice the tiny root worms.

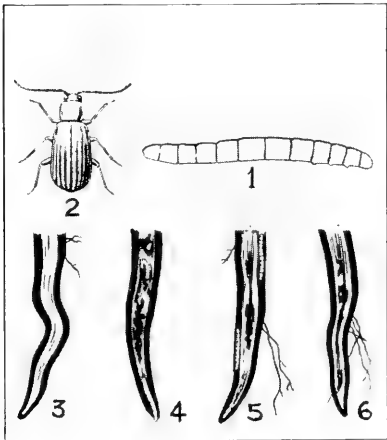
The root worms themselves are small, slender white grubs, about half an inch long when they are full grown. Infested stalks of corn may be pulled out easily and will break off at the place where the root worms are at work,

leaving the greater part of the roots in the soil. Frequently infested stalks are blown to the ground by wind, the root system having been so cut off that the stalks cannot stand the strain.



THE CORN ROOT WORM.

Showing the worm at work in corn root. (Enlarged.)

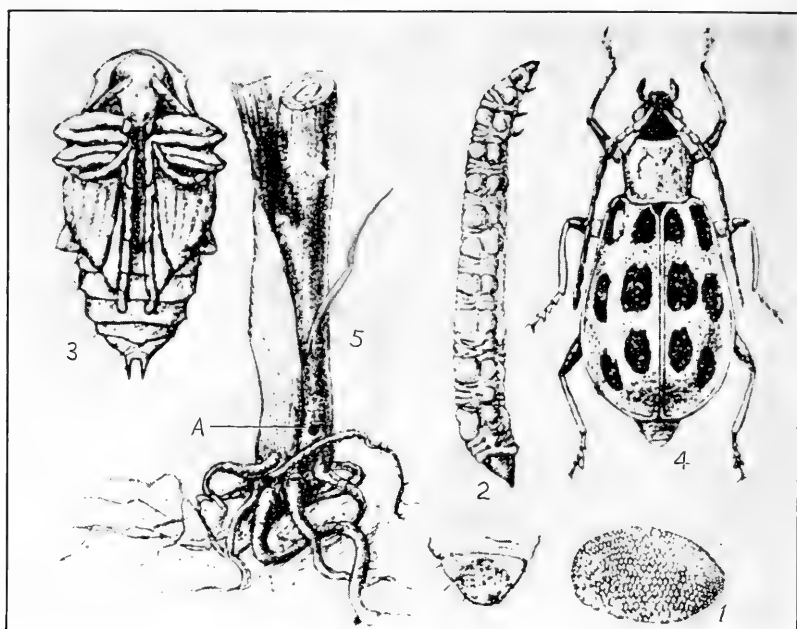


NORTHERN CORN ROOT WORM.

1. Larva; 2. Beetle; 3, 4, 5, and 6. Corn roots eaten by the worm.

Shortly after midsummer the root worm becomes full-fledged, pupates, and emerges as a grass-green beetle. This beetle feeds on the silk at the top of the ear, and when this dries works its way down inside the husk and feeds upon the corn itself. Before the beetles die they leave the corn and lay their eggs in the ground. The eggs hatch in the spring, and the life cycle is thus completed.

The beetles of the southern root worm are larger than those of the other species and have three transverse rows



SOUTHERN CORN ROOT WORM.

1. Egg; 2. Larva; 3. Pupa; 4. Beetle; 5. Infested stalk.
A. Showing where larva entered stalk.

of four black spots on wing covers. Both species live wholly on corn, harming no other plants so far as is known.

The Corn Ear and Leaf Worm or Boll Worm

This is the common greenish or brownish “worm” that eats into the ears of both field and sweet corn. The eggs are laid usually in the silk of the ear, and the young larva soon begins to feed, eating into the grains of corn at the tip of the ear. As it grows it tunnels down toward the butt end, eating only a part of the corn, yet injuring the whole ear so far as market purposes are concerned.

It sometimes feeds on the leaves, causing heavy damage to the plant by destroying the canals and tissues.

The corn ear worm spends the winter in the pupa state

in the ground. Sometimes in late spring, in May or June, the adult moths emerge and deposit their eggs on the corn. If the weather is favorable during the first half of September (mild), these larvae may still be found, eating on the ears and leaves.



THE CORN EAR WORM.

Showing the destructive larva at work in ear of corn.

Mature larvae measure about one and one-half inches in length. The moth, a rather stout insect, measures three-fourths of an inch in length.

The larvae vary in color from light green to brown, being more or less striped in appearance, with alternating light and dark lines.

In the South they are called “boll worms,” as they also feed on the bolls of the cotton plant.



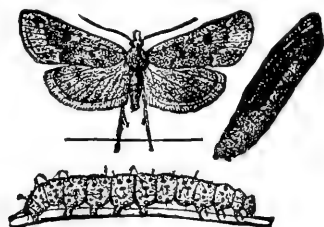
THE CORN EAR WORM.

Showing larva at work on blades of corn. When it does this injury it is sometimes known as the “shuttleworm.”

Corn Root Web Worm

Corn root web worms are the larvae of several species of moths. Their eggs are laid in the summer among the grasses, and, ordinarily, injury is to be encountered only where corn follows grass. The larvae pass the winter in

a half-grown condition and attack the young corn just above the ground. When not at work they remain in a silken web just underneath the ground at the base of the plant. Their name is derived from this habit. The full-grown larvae are about half an inch long, varying in color from brown to dirty



VARIOUS STAGES OF THE WEB WORM.

white. Ordinarily they work at the roots of the corn plant, but are often found farther up the stalk working beneath their protective web, feeding upon the foliage and sometimes devouring the whole leaf.

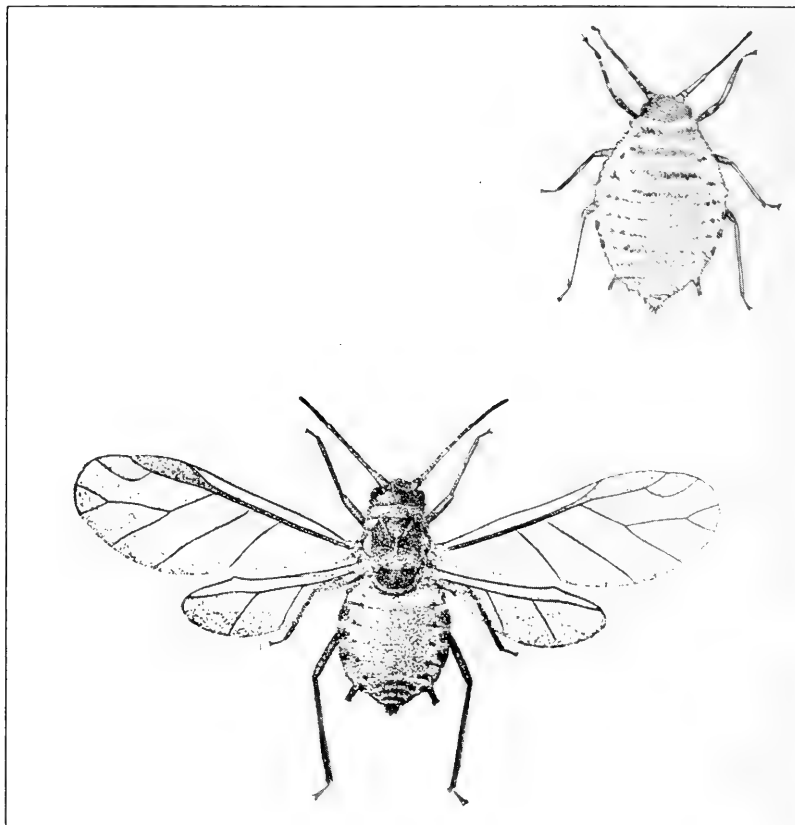
They pupate from May to July, depending on locality, emerging into the moth stage. There are several broods each year.

The Corn Root Louse

The corn root louse is a small bluish-green insect. There are both winged and wingless types. Eggs are laid by the lice during September and October in ant hills, are collected by the ants and cared for through the winter. In spring when the lice begin to hatch, the ants tunnel to the roots of the corn and carry the young insects to them. The lice are equipped with tiny beaks and feed upon the stalk of the plant, hanging to the roots in clusters, robbing the roots of the food necessary to sustain the stalk and leaves of the plant.

Their presence can be determined by pulling or digging up the plant, a careful inspection of which will reveal the bluish-green particles. The affected plants appear yellow and sickly and grow very slowly, or not at all. The lice do their greatest injury during May and June, and their attacks are usually in spots throughout the field adjacent to the ant

hills. The injury done by these insects is variable and irregular, and they may be found in one locality while another quite close is entirely free from them. This is



CORN ROOT LOUSE.

Winged and wingless varieties of the corn root louse.
(Greatly enlarged.)

due, doubtless, to the fact they have many enemies which prey upon them, and they cannot thrive if these foes are present.

The Corn Plant Louse

The corn plant louse is closely related to the corn root louse, which it resembles. Its work is confined entirely to the plant above ground, and it is less injurious than the root louse. The general appearance and habits of the two are so very similar that it is unnecessary to go into more detailed description.

PART TWO

DISEASES

Corn has been generally considered less subject to attacks of fungous disease than other grain crops because there have been no widespread epidemics as with wheat, in the case of which rust sometimes destroys the entire crop over an extended area. However, such attacking diseases as corn smut and other bacterial diseases of corn are well known and have always caused serious damage.

Stalk Fungus

This disease is characterized by falling of the corn, the stalks breaking close to the joints. Affected plants contain



FUNGUS INFECTION.

Diseased stalk, showing manner of breaking at lower part of stalk.



(Photograph by Culbarn)

RESULTS OF FUNGUS ATTACK.

Many stalks broken near the lower nodes; others prostrate on account of diseased roots.



RESULTS OF HAIL DAMAGE.

Corn field showing results of hail damage. Note that the general appearance of the field is much the same as fungus damage, illustrated above.

only small ears or are barren. When a grower's attention is called to this condition, the rejoinder is usually made that the stalks were broken over by hail.

The disease attacks the roots and stalks. In some instances its intrusion has been so severe that entire fields of corn have been broken flat to the ground.

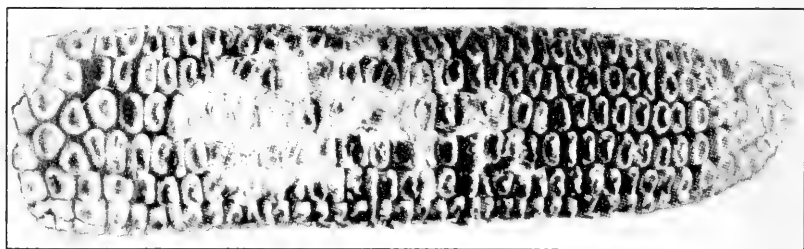
In some fields 10 stalks out of 22 were attacked; in one field, 23 out of 26 were involved. In one upland field of corn, considered a good stand, 41 per cent of the plants were attacked, and the yield was a little over one-half of a normal crop. In many other fields the loss was only one-third of the crop. Without some knowledge of this disease one might easily confuse the damage to the crop with that caused by hail.

These fungus germs are capable of living through the winter either in manure piles on diseased ground or on diseased stalks left in the field. There is no known cure or preventive except a careful selection of seed from healthy plants taken from parts of the field where no fungus has made its appearance.

The accompanying photographs (pages 30, 31) showing a field of corn where this disease has attacked the stalks, together with a cornfield that has been hailed, give an illustration of similarity of damage caused by two different corn enemies.

Ear Scab or Ear Rot

There are four infections of corn ears which are commonly referred to as scab or rot. The damage done is sometimes claimed as that of hail, but where an ear is hit by a



CORN EAR ROT.

Showing effect of fungi on corn ear, commonly referred to as scab or rot.

hailstone hard enough to cause rot the impression in the outer husk is sufficiently marked so that no confusion should result.

Smuts of Corn

Smut diseases of corn are so evident and well known that it is impossible to confuse this condition with hail damage. Hence no further identification need be made here. The accompanying photograph illustrates the smut attack on the ear and tassel.



THE CORN SMUT ON EAR.

When ears of corn are affected in this manner the result is nothing short of a total loss.

PART THREE

CAUSES OF LOSS TO CORN OTHER THAN INSECT OR DISEASE CONDITIONS

Aside from insects and disease conditions which occasion a very considerable loss to corn, there are numerous other causes for a material reduction of yield or a complete failure of the crop. Knowledge of the elementary principles and processes of corn culture is therefore essential to the intelligent handling of these losses.

Any disregard of the fundamentals, in attempting to produce corn, is likely to result in a loss, as of all the cereals it is most affected by adverse conditions.

Corn requires a better soil than do other cereal crops, and is most susceptible to injury by unfavorable climatic changes. It grows best on deep, fertile soils in warm moist climates, and needs frequent showers and plenty of sunshine. It is especially liable to injury by drought and hot winds when it is silking and tasseling and from the time the ears first show silk until they are past the roasting-ear stage.

If the correct practices of corn-growing are not observed, a weakened stalk is produced which can neither overcome unfavorable weather conditions nor successfully combat insect or disease enemies; and while these foes show no preference between a sick and a healthy plant, a hardy stalk, growing from pure seed, fortified with a cluster of strong roots and firmly imbedded in a properly prepared and carefully cultivated seed bed, will survive long after the unhealthy weakened plant has succumbed.

Because corn is subject to serious loss through careless or unintelligent farming, a summary of methods is here included which have a bearing on hail insurance, for spurious hail claims are most frequently reported in those sections where midsummer drought, hot winds, poor soil, and indifferent farming practices prevail.

The science of corn-growing is divided into eight processes, as follows:

1. Seed selection.
2. Storing of seed.
3. Testing of seed.
4. Preparation of seed bed.
5. Planting.
6. Cultivating.
7. Harvesting.
8. Marketing.

A corn crop is half grown before the seed is planted, and, without careful attention to the first three processes, operations four, five, and six will be of small avail, even though the most approved methods are applied with painstaking care, and seven and eight either will never be realized or will be attended with disappointment because of unsatisfactory results.



RESULTS OF IMPORTED SEED.



RESULTS OF ADAPTED SEED.

Note the comparatively more vigorous growth of the stalks and the larger size of both stalks and ears.

Seed Selection

“There is just one worse way to select seed corn than to pick it from the crib in the spring, and that is to pick it from a neighbor’s crib after dark.”

The unescapable result of poor seed is either a kernel that does not germinate or a weak sickly plant which, true to the governing law of plant life, produces a nubbin instead of a well-filled ear of marketable corn.

The character of the seed used is therefore a most important factor in the production of a large corn crop, and especially because it is so likely to be defective. Selection of fertile soil, good cultural methods, and protection against insect and disease enemies are of the greatest importance in contributing to the final results, but all these factors cannot overcome indifferent seed selection.

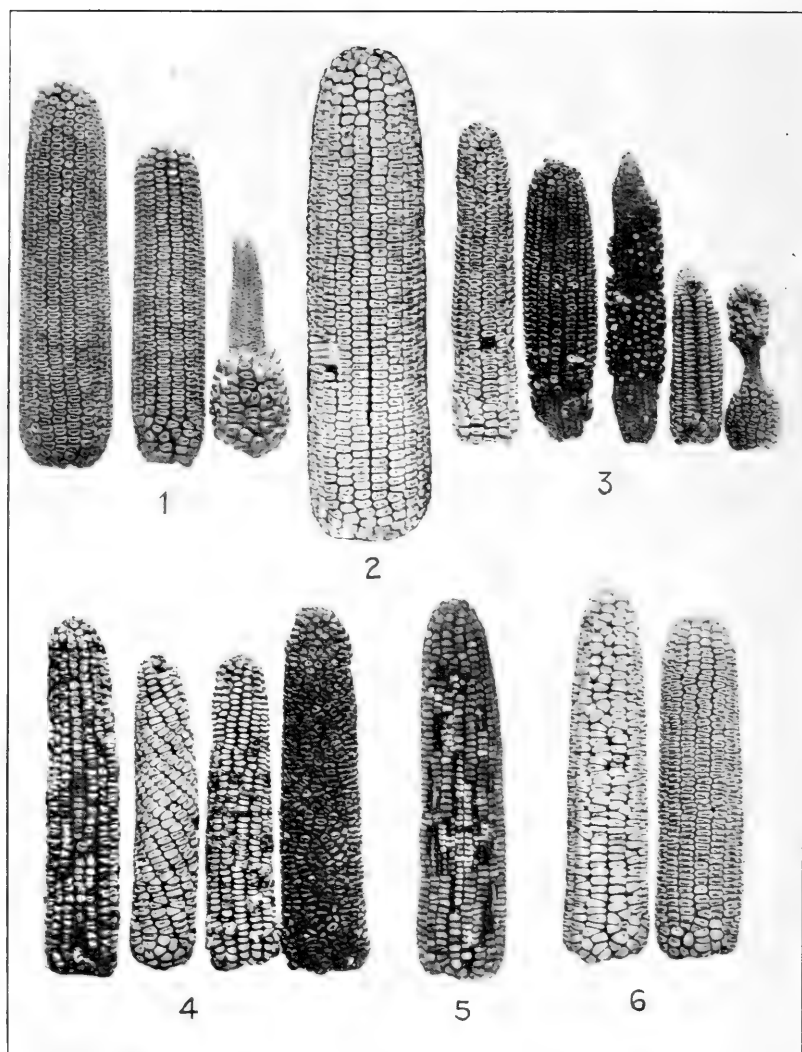
Experiments with unknown and imported seed are dangerous, as corn must become adapted to a general locality. Seed should be selected in the neighborhood in which it is to be planted.

To secure a full stand of vigorous plants, able to combat unfavorable weather conditions and overcome insect and disease enemies up to the final production of a good crop, carefully selected, *home-grown* seed must be used.

Many farmers overlook or ignore these important features, and the inevitable result is poor yield and poorer quality.

When the certainty of good seed is one of the cheapest and simplest ways of increasing the corn crop, and when the farmer has the benefit of the expert advice of his state agricultural college offered him and even brought to his door by extension trains, institute meetings, and frequent bulletins—all free of charge—fundamentally correct methods are too often overlooked.

If seed of a uniform size and high germination test is evenly planted in a scientifically prepared seed bed on selected soil, and is then properly cultivated, there will be surprisingly few spurious hail claims, and these will be in evidence only when most unfavorable climatic conditions have prevailed over an unusual period.



WHY A CAREFUL SELECTION OF SEED CORN IS ESSENTIAL.

Fig. 1—These three ears came from the same hill. The difference between them is due to the producing power of their parents.

Fig. 2—Here is a remarkably well-shaped ear of corn. It has breeding and brains back of it.

Fig. 3—Scrubs or degenerates. They are always most numerous when conditions are unfavorable, such as poor ground, late planting, poor cultivation, careless selection of seed, etc.

Fig. 4—More degenerates. What happens where we have a mixture of different types of corn.

The first ear was too late. The only fertilization it received was from the old and weak grains of pollen which blew off the leaves and tassels where it had lodged.

The third ear is the result of a mixture of early and late types. Notice the many broken or ruptured kernels. These inherited the late characteristics of one of the parents and were soft when other kernels hardened and crowded them. The crowns broke open and have become rotten and moldy.

The second and fourth ears are faulty because of the irregular rows and consequent irregular kernels.

Fig. 5—Broken kernels. Probably caused by a disease in connection with the silks, which sometimes lie between the rows of kernels as they develop. This condition will not be detected until kernels are removed for study, or the ear is shelled.

Fig. 6—The first ear has 540 kernels, while No. 2 has 1,140, or double the number on ear No. 1.

When tested in the planter, No. 1 dropped 158 kernels in 100 drops, while No. 2 dropped 387 kernels in 100 drops or checks. But this is not the only disadvantage; the yield and quality of the crop will be affected in other ways. There will be immature, moldy, and frozen corn, high ears and low ears, ears hard to husk and ears easy to husk, etc.

DO NOT IMPORT SEED CORN

HOME GROWN SEED BEST

6000 TESTS—8 YEARS—33 COUNTIES—IOWA
YIELD

HOME
GROWN
SEED

67 BU

IMPORTED
SEED

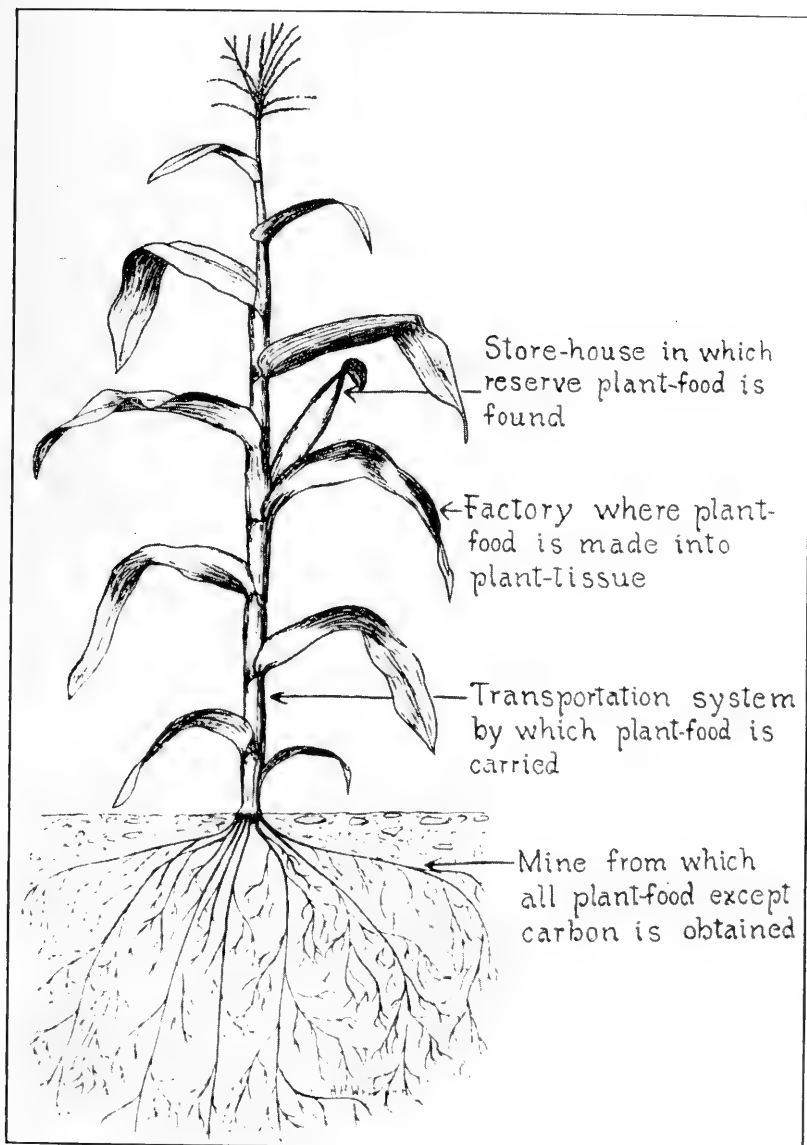
47 BU

**20 BU.
LOSS**

HOME GROWN SEED
GIVES LARGER YIELD BETTER QUALITY
SAVES LAND LABOR FOOD MONEY

Deep Cultivation; Its After-Effects on Growing Corn

Twenty years ago had a farmer been asked, "Why do you cultivate corn?" he would probably have replied: "To kill the weeds."



Note extended root system. Deep cultivation disturbs the roots and often kills the plant.

Ask that question now and a most general response would be, "To conserve moisture."

Agriculturalists have learned that surface cultivation is of first importance, inasmuch as it brings forth best results without disturbing the root systems of the growing plants.

Corn roots intermingle between rows. Deep cultivation when plants are coming forth may disturb roots and, in some cases, break them apart, causing stalks to wilt and dry up, often ending in decay.

Some growers, particularly those in wheat-raising sections, seem to be wholly unaware of this important situation, even though much has been written on the subject.

It is by no means uncommon for an assured to feel that a hailstorm caused a setback to his corn crop, and he may even point out the sickly, drooping appearance of the leaves to substantiate a claim.

Deep cultivation of waist-high corn may produce a similar general appearance and cause the same apparent after-effect as that following a hailstorm.

A planter in Kearney County, Neb., recently claimed a hail loss on 150 acres of corn, asking 50% on 60 acres and 20% on the remainder of his crop. After the adjuster had made a careful examination, accompanied by assured, it was found that the claim was not exorbitant, for the corn plainly showed evidence of serious damage. The 50% loss, however, stopped on a single row of corn extending entirely across the field, and the 20% loss began on the next row—and at one end of that row stood a corn cultivator.

The soil of the 60-acre tract showed evidence of recent cultivation, while the remainder of the field did not. The crop involved was badly infested with weeds, and the assured admitted that he had dropped the cultivator shovels below the surface of the ground at least eight inches.

As examination of the roots of plants on the 60-acre field showed clearly how an additional loss had occurred, the farmer was convinced of the mistake made by cultivating too deeply and readily accepted a proper and equitable settlement for the actual hail damage sustained.

Crop Rotation for Corn

One of the commonly neglected features of all farming operations is rotation. Until the American husbandman learns to rotate his crops intelligently, he will have diminished yields, indifferent quality of grain, and various loss conditions often, to the untrained eye, closely resembling hail damage. These are caused by the ravages of insects, the insidious working of various fungi, and, less frequently, by depleted soil.

When corn is grown continually on the same land, this condition is inevitable, and in case of a possible hail damage



CROP ROTATION.

Crop rotation means life to the soil and death to insects.

The next year corn should be planted elsewhere.

a little inquiry as to the number of consecutive years a field has been planted to corn may yield information as to the cause of damage.

A rotation of crops is good farm practice. By growing different crops the planter is able to distribute his labor over a greater part of the year, and thus handle more ground with the same equipment and horsepower. There is less risk of a total failure for the season, since, if drought



or hail injures or destroys one crop the others may escape injury.

The various experiment stations and agricultural colleges in the different states have determined the best scheme of rotation for their respective territories and are anxious to disseminate this valuable information. The planter alone, therefore, is responsible for all loss caused by lack of a correct system of cropping.

Climatic Conditions

Climatic conditions prevailing during the season and the state of weather immediately preceding a suspected hail damage to corn have a bearing on nearly every such claim.

Unseasonable frosts, hot or high winds, cold rainy weather, hard, beating rains, or too much moisture will cause a most serious loss that is frequently charged to hail account and in fact often closely resembles hail damage. This is especially true if proper farming methods have not been followed, or if the crop is undergoing the ravages of disease or insect pests.

Leaves of corn are easily whipped to ribbons by the wind, or the pollen is dislodged by a hard, beating rain. Hot winds may wither the leaves and blast the ears, and frost, cold rainy weather, or too much moisture cause the young plants to turn yellow and wilt, much as if they had really been hailed. All these conditions are well known to experts.

“To do only what you set out to do
indicates that you did not set out to do enough.”

Summary of Losses to Corn—What to Look For and Where to Find It

	CAUSED BY	LOOK FOR	WHERE FOUND	APPEARANCE OF LOSS
*Loss to the Stalks	Nature of Damage			
	Cornstalk Borer	Larva (Worm)	In Stalk near Ground	Top wilting and dying. Plant breaking over. Look for round hole in stalk, near ground line. Attacks corn at from 2 to 10 inches high.
	Corn Bill Bug	Beetle	Toward Center of Stalk	Plant killed when very young.
	White Grub	Common White Grub	Feeding on Roots	Roots eaten away and stalk dies.
	Wireworms	Larva (Worm)	Roots	Seed eaten out or corn has germinated. Young roots eaten, larger ones bored into. Look on live plants, not dead ones.
	Chinch Bug	Bugs of Varying Sizes	On Stalks in Great Numbers	They suck the life from plants. All of crop destroyed from edge of field inward as they advance.
	Cutworms	Larva (Worm)	At Base of Plant	Cutting plant entirely off eventually.
	Corn Root Worm	Larva (Worm)	Throughout Root System	Roots eaten. Stalk pulls out easily, is blown over by wind, or falls over eventually.
	Fungus	Spores of Fungi	On Stalk, Roots, and Leaves	Breaks near joint. Improper growth. Poor ears or none at all.
	Root Louse	Clusters of Lice	On Roots	Stalk dying or growth retarded.
*Loss to the Leaves	Web Worm	Larva and Web	On or near Roots	Wilted and dying plant.
	Improper Cultivation	Depth of Cultivating		Corn dying from roots being severed. Adjacent fields not injured.
	Corn Bill Bug	Beetle	On Corn or Nearby Weeds	2 to 5 holes in leaves all in a row.
	Corn Ear or Leaf Worm	Larva (Worm)	In Ear or on Leaves	Irregular holes in leaves similar to hail damage.
	Wind	Ribbioned Leaves	On All Plants	Leaves whipped to ribbons. Some irregular holes in leaves.
	Beating Rain	Small Holes	On All Plants	Small holes in leaves but no sign of hail on stalk.
	Fungus	Spores of Fungi	On Stalks, Roots, and Leaves	Ears deformed or entirely lacking. Whole plant unhealthy.
	Smut	Fungus Mass	Where Ear Should Be	Smut mass.
	Corn Ear and Leaf Worm	Larva (Worm)	In Ear or on Leaves	Eats into the ear, causing large areas of shrivelled kernels or many entirely gone.
	Smut Ears			
*Loss to the Ears				

*HOT WINDS OR FROST AND TOO MUCH OR TOO LITTLE MOISTURE CAUSES PLANTS TO TURN YELLOW OR DIE
IMPROPER SELECTION OF SEED IS EVIDENT IN A SMALL WITHERED OR DEFORMED EAR.

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